

*IN THE UNITED STATES PATENT AND TRADEMARK OFFICE*

In re Patent Application of:  
Kazumi Nii et al.

Application No.: 10/560,735

Confirmation No.: 3722

Filed: December 15, 2005

Art Unit: 1786

For: ELECTROLUMINESCENT DEVICE

Examiner: Michael WILSON

**DECLARATION UNDER 37 CFR 1.132**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Toshihiro ISE, declare and say as follows:

I received a Doctor's Degree in Chemistry from Tohoku University, Graduate School of Science, in March of 1999. I joined Fuji Photo Film Co., Ltd., which is now Fujifilm Corporation, in April of 1999. I have been engaged in the research and development of organic electroluminescence devices since that time.

I am familiar with U.S. Application Serial No. 10/560,735, of which I am a co-inventor. I have reviewed all Office Actions issued in connection with this application. I have also reviewed all of the references cited by the Examiner in these Office Actions.

The following experiments were conducted either by me or under my direct supervision. These experiments demonstrate that the present invention is superior and exhibits unexpected

and advantageous properties with respect to the cited references – specifically, US 2002/0074935 A1 (“Kwong”) and US 2002/0028329 A1 (“Ise”).

Additional Comparative Device 1 (Kwong's Example 2)

An electroluminescent device with the following layer configuration was prepared using a known deposition technique.

Layer configuration (the values in parentheses are thicknesses of the respective layers):

ITO/CuPc(10nm)/NPD(40nm)/46%NPD+46%Alq+8%BtpIr(20nm)/Alq(50nm)/LiF(5nm)/Al

The ratio of the three components (NPD, Alq, BtpIr) in the light emitting layer is the same as that of Example 1 of Kwong. The thicknesses of the respective layers are the same as those of Sample 102 in the working examples of the present application. That is because the thicknesses and the ratio of three components in the light emitting layer are not described in Example 2 of Kwong.

The external quantum efficiency of the device of Additional Comparative Device 1 was measured in the same manner as in the working examples of the present application. The thus-obtained quantum efficiency was 1.0%.

Additional comparative devices 2-4 and an additional inventive device 1 were prepared in the same manner as for Additional Comparative Device 1 except that the respective layer configurations were changed as indicated below, and the external quantum efficiencies of the comparative devices 2-4 and the inventive device were measured.

Additional Comparative Device 2 (Single Host)

Layer configuration:

ITO/CuPc(10nm)/NPD(40nm)/92%NPD+8%BtpIr(20nm)/Alq(50nm)/LiF(5nm)/Al

The two host materials in Comparative Device 1 were changed to a single host material (NPD). External quantum efficiency: 0.6%

Additional Comparative Device 3 (Single Host)

Layer configuration:

ITO/CuPc(10nm)/NPD(40nm)/92%Alq+8%BtpIr(20nm)/Alq(50nm)/LiF(5nm)/Al

One of the host materials in Comparative Device 1, NPD, was replaced with Alq.  
External quantum efficiency: 1.7%

Additional Comparative Device 4 (Single Host: Ise's Example 1)

Layer configuration:

ITO/NPD(50nm)/94.4%CBP+5.6%BtpIr(36nm)/H-1(24nm)/LiF(5nm)/Al

The light emitting material of Example 1 of Ise, "K-1", was replaced with BtpIr mentioned in Comparative Device 1. "K-1" in Ise is a green phosphorescent material. It is believed to be preferable to compare a device using BtpIr (a red phosphorescent material) with Applicants' invention. External quantum efficiency: 3.5%

Additional Inventive Device 1

Layer configuration:

ITO/CuPc(10nm)/NPD(40nm)/46%CBP+46%H-1+8%BTPIr(20nm)/Alq(50nm)/LiF(5 nm)/Al  
External quantum efficiency: 6.2%

Conclusion: The present invention (as represented by Additional Inventive Device 1 – external quantum efficiency = 6.2%) is unexpectedly superior to and exhibits unexpected and advantageous properties as compared to Kwong (as represented by Additional Comparative Device 1 – external quantum efficiency = 1.0%) and to the Ise reference (as represented by Additional Comparative Device 4 – external quantum efficiency = 3.5%), and additional Comparative Devices 2 and 3.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Signature

Toshihiro ISE Toshihiro Ise  
Printed Name

July 23, 2010  
Date